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14 DEC 1964

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**MEMORANDUM FOR:** Chief, Collection Guidance Staff

**SUBJECT** : Application of Satellite Derived Imagery  
to the Strategic Early Warning (Indications)  
Problem

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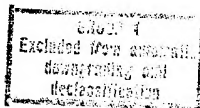
1. Subsequent to our 1 December discussions with [redacted] I have done some thinking about how one might approach the problem of assessing the utility of imagery derived from satellite platforms for improving U.S. capability for strategic early warning. This memorandum summarizes a possible approach to this problem and may be of some assistance to you in your planning.

2. A comprehensive study program with the dual objectives of assessing the applicability of imagery to strategic early warning and identifying the basic collection system parameters of importance for this mission, divides naturally into four phases:

- a. Identification of significant observables.
- b. Development of meaningful patterns of activity.
- c. Analysis of the impact of various sampling procedures on the capability to detect specific patterns of activity.
- d. Specific case studies.

3. The first phase of this program, as I would envision it, is relatively straight forward. It involves constructing a tabulation of specific observables, events, or objects which may have some relevance to the Sino-Soviet posture. Simple examples are number

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and type of aircraft at airfields, activity at airfields and support facilities, number and type of naval vessels at port facilities, number and type of vehicles at ground forces installations, missile sites, atomic energy installations, SAM sites, railroad yards, etc. This tabulation of observables can then be used in the second phase of the study where the objective is to determine specific patterns of activity or events which might be meaningful indicators with respect to Sino-Soviet posture or changes in that posture. Thus, for example, one might note that at a medium range Soviet missile site there is a normal pattern of activity involving training exercises and missile movements which when interrupted would indicate an abnormal status. Or, alternatively, one might note an increase in the number of missiles which appear to be in a ready status thus indicating change in state of preparedness. It might be concluded that specific types of aircraft moving to specific airfields constitutes an increase in readiness status or a potential preparation for offensive action. Perhaps deviation from normal aircraft movements could also be construed as an indication of change in the military posture. Similarly, one might consider ground forces and naval installations from the same point of view.

4. During this second phase of the study program it is important to think independent of collection system constraints and, rather, visualize the problem as if one had a continuous "moving picture" of the entire Sino-Soviet Bloc. This device will tend to focus attention on the basics of the strategic early warning problem and discourage a premature folding in of real or imagined collection system characteristics. If it is concluded that there is a reasonable possibility that the observation of specific events or patterns of activity can yield meaningful information concerning Sino-Soviet intentions, then a third study program phase will be necessary. This third phase must couple collection system characteristics with the results of Phase Two with the objective of developing sampling techniques which will yield useful information within the limitations of practical collection and data processing systems. At this point it will be necessary to interface intelligence oriented people with engineering oriented people to insure a realistic overall assessment of the problem.

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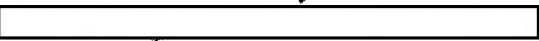
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5. The final phase of the study program should come to grips with specific collection system requirements along with the closely related problem of data processing and analysis. For example, in the case of a photographic sensor it will be necessary to home in on the resolution requirement, on the data rate requirement, and on the specific mode of operation best suited the particular mission. At the same time the question of how the photographic information will be handled on the ground to support timely and convincing deductions from the evidence available must be addressed. One mechanism for conducting this phase of the study program might be the construction of case studies using war gaming techniques to actually exercise a hypothetical problem situation.

6. This is clearly a large and time consuming endeavor as I have outlined it. While there may be various ways of short cutting the study program and certainly other ways of structuring it, I am convinced that the kinds of collection systems we are talking about in this context 

 and the kinds of problems one might hope to solve with data derived in this way, are sufficiently divergent from past experience so that a substantial effort is indeed required. We plan to parallel this study program with critical engineering studies and component development work so that at the conclusion of the study clear alternatives from a hardware and cost point of view can be realistically assessed against any specific requirements which may emerge.

7. If there is any support we can provide in this regard, we will be happy to do so.

  
Chief, Design and Analysis Division  
Office of Special Projects

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